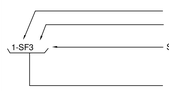
FULLY SPRINKLERED

DRAWING SYMBOLS



BUILDING NO. WHERE EQUIPMENT IS LOCATED.
EQUIPMENT ABBREVIATION (SUPPLY FAN)
SUPPLY FAN NO.3 IN BUILDING NO.1
TYPICAL UNIT NO.

RATED WALL ASSEMBLY. REFER TO ARCHITECTURAL DRAWINGS FOR RATING.

DUCTWORK SYMBOLS

SUPPLY DUCT (UP & DOWN)

EXHAUST DUCT (UP & DOWN)

CEILING DIFFUSERS (FOUR WAY BLOW UNLESS OTHERWISE NOTED)

EXHAUST OR RETURN CEILING REGISTER OR GRILLE

SUPPLY TOP REGISTER OR GRILLE (WALL TYPE)

EXHAUST OR RETURN BOTTOM REGISTER OR GRILLE, (WALL TYPE)

EXHAUST OR RETURN TOP REGISTER OR GRILLE, (WALL TYPE)

VANED ELBOW & AIR SPLIT TYPE DUCT TAKE-OFF

INCLINED RISE, IN DIRECTION OF AIR FLOW

INCLINED DROP, IN DIRECTION OF AIR FLOW

VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES)

STANDARD RADIUS ELBOW

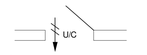
NEW DUCT - WIDTH X DEPTH

MANUAL VOLUME DAMPER

FIRE DAMPER

APPROXIMATE ELEVATION FROM FLOOR TO CENTER OF LISTED SIZE OF PIPE.

APPROXIMATE ELEVATION FROM FLOOR TO BOTTOM OF LISTED DUCT.



DOOR UNDERCUT BY GENERAL CONTRACTOR

WELDED STAINLESS STEEL DUCT

CONTROLS

T H ROOM CONTROL: THERMOSTAT, HUMIDISTAT

FAN SCHEDULE

FAN NO.	LOCATION	FAN CFM	FAN S.P.	FAN TYPE	DESCRIPTION	WHEEL TYPE	WHEEL MIN. DIA.	MAX. RPM	DRIVE	MAX. SONES	MOTOR MAX. BHP	MOTOR NOM. HP (2)	MOTOR VOLT.- PHASE	MOTOR VFD	SEE NOTE
1-EF1	MECHANICAL PENTHOUSE	850	0.9"	ICF	SQUARE IN-LINE CENTRIFUGAL (IMAGING MRI EMERGENCY EXH.)	BIW	13"	1,585	BELT	-	0.45	0.5	115-3	NO	-

DUCT PRESSURE CLASS & LEAKAGE TABLE

SYSTEM	DUCT INVOLVED	POSITIVE (P) OR NEGATIVE (N) PRESSURE	SMACNA CONST. CLASS W.G.	SMACNA SEAL CLASS	SMACNA LEAKAGE CLASS RECTANGULAR DUCT	SMACNA LEAKAGE CLASS ROUND DUCT
ALL SYSTEMS	ALL DUCTWORK EXCEPT AS LISTED BELOW.	P/N	± 2"	A	6	3
	SUPPLY AIR DUCTS FROM OUTLET OF AH-UNIT TO INLET OF AIR TERMINAL UNITS.	P	4"	A	6	3
	SUPPLY AIR DUCTS FROM OUTLET OF AIR TERMINAL UNITS TO SUPPLY AIR DEVICES	P	1"	A	6	3
	RETURN AIR DUCTS FROM CEILING REGISTERS TO INLET OF AH-UNIT	N	-3"	A	6	3
	GENERAL EXHAUST DUCTS	N	± 2"	A	6	3

AIR TERMINAL UNIT SCHEDULE

UNIT NO.	CFM MAX.	CFM WINTER MIN.	CFM SUMMER MIN.	APPROX. INLET SIZE (IN.)	DUCT RUNOUT SIZE TO UNIT (IN.) (1)	UNIT MAX. SP AT MAX. CFM (2)	SOUND REQUIREMENTS SP ACROSS UNIT AT MAXIMUM ROOM NC	SOUND REQUIREMENTS MAX. ROOM NC (3) (4)	CONTROL TYPE (5)
19-2	300	-	0	6	8	0.35"	3.0"	35	V.V.R.

NOTES :
1 PROVIDE DUCT TRANSITION AT UNIT INLET WHERE UNIT INLET SIZE AND DUCT RUNOUT SIZE ARE DIFFERENT.
2 CONTROL TYPES: V.V.: VARIABLE VOLUME TERMINAL; V.V.R.: VARIABLE VOLUME REHEAT TERMINAL

HVAC DESIGN DATA

OUTDOOR DESIGN TEMPERATURES — 93 DEG. F Db SUMMER; 74 DEG. F Wb SUMMER; 5 DEG. F Db WINTER — DESIGN ALTITUDE: 482 FT.

INDOOR AREA DESIGN CONDITIONS	SUMMER Db (°F)	SUMMER % HUMIDITY	WINTER Db (°F)	WINTER % HUMIDITY
MRI SCANNING ROOM	69	50	72	40
SYSTEM COMPONENT ROOM	70	50	72	40

PIPING SYMBOLS

V — VENT LINE
MU — SOFT DOMESTIC WATER MAKEUP
D — DRAIN LINE
R — REFRIGERANT (LIQUID AND SUCTION)
GCS — GLYCOL CHILLED WATER SUPPLY
GCR — GLYCOL CHILLED WATER RETURN
QV — QUENCH VENT
DIRECTION OF PIPE PITCH (DOWN)
DIRECTION OF FLOW
REDUCER OR INCREASER
ECCENTRIC REDUCER
TOP CONNECTION, 45 DEG. OR 90 DEG.
BOTTOM CONNECTION, 45 DEG. OR 90 DEG.
SIDE CONNECTION
CAPPED OUTLET
RISE OR DROP IN PIPE
UNION
PIPE UP
PIPE DOWN
POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK.
STRAINER
THERMOMETER
PRESSURE GAGE
EXISTING PIPE TO BE REMOVED
TEST PLUG (PRESSURE/TEMPERATURE)

VALVES

CHECK VALVE
BUTTERFLY VALVE
BALL VALVE
COMBINATION BALANCING/SHUT-OFF VALVE
CIRCUIT SETTER
STRAIGHT-THRU MODULATING CONTROL VALVE
STRAIGHT-THRU TWO-POSITION CONTROL VALVE
THREE-WAY MODULATING CONTROL VALVE
AUTOMATIC FLOW CONTROL VALVE
MANUAL AIR VENT

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFW	AIR FOIL WHEEL (FAN)
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
APD	AIR PRESSURE DROP
ATC	AUTOMATIC TEMPERATURE CONTROLS
BHP	BRAKE HORSEPOWER
BIW	BACKWARD INCLINED WHEEL (FAN)
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CD	CEILING DIFFUSER
CF	CENTRIFUGAL FAN
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
CR	CEILING REGISTER
CU	CONDENSING UNIT
Db	DRY BULB TEMPERATURE, DEG. F
dBA	DECIBELS
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DI	DIGITAL INPUT
DIA	DIAMETER
DO	DIGITAL OUTPUT
DPS	DIFFERENTIAL PRESSURE SENSOR
DWDI	DOUBLE WIDTH DOUBLE INLET (FAN)
ECC	ENGINEERING CONTROL CENTER
E.C.L.	ETCHED CLEAR LACQUER
EF	EXHAUST FAN
ENT	ENTERING
EX.	EXISTING
F	FAHRENHEIT
FLR.	FLOOR
FPM	FEET PER MINUTE
FT	FEET
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
ICF	IN-LINE CENTRIFUGAL FAN
IN	INCHES
IN WC	INCHES WATER COLUMN
IN WG	INCHES WATER GAUGE
LAT	LEAVING AIR TEMPERATURE
LVG	LEAVING
MAX	MAXIMUM
MBH	1000 BTUH
MERV	MINIMUM EFFICIENCY REPORTING VALUE
MIN	MINIMUM
NC	NOISE CRITERIA
NOM	NOMINAL
O.A.	OUTSIDE AIR
PD	PRESSURE DROP (FEET OF WATER)
Rh	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SF	SUPPLY FAN
S.P.	STATIC PRESSURE (INCHES OF WATER)
TR	TOP REGISTER (WALL TYPE)
U/C	DOOR UNDERCUT BY GENERAL CONTRACTOR
VAV	VARIABLE AIR VOLUME
Wb	WET BULB TEMPERATURE, DEG. F
W.B.E.	WHITE BAKED ENAMEL

GENERAL NOTES:

1. THESE NOTES APPLY EQUALLY TO THE FULL SET OF DOCUMENTS.
2. INCLUDE ALL WORK NECESSARY TO ACCOMMODATE PHASING. REFER TO ARCHITECTURAL DRAWINGS AND GENERAL REQUIREMENTS SECTION 01 00 00. ADDITIONAL NOTES DESCRIBING PHASING DETAILS ARE INCLUDED THROUGHOUT THE DRAWING SET.
3. INSULATE DUCTWORK AND PIPING WHERE EXISTING INSULATION HAS BEEN DAMAGED AND/OR REMOVED IN THE PERFORMANCE OF WORK IN THIS PROJECT.
4. THE CONTRACTORS SHALL REFER TO ALL SPECIFICATION SECTIONS AND THESE DRAWINGS FOR DETAILS OF BUILDING CONSTRUCTION TO ENSURE SPACE AND SATISFACTORY ARRANGEMENT FOR THEIR WORK. THE VARIOUS DRAWINGS COMPRISING THE SET ARE INTERDEPENDENT AND MUST BE USED JOINTLY AT ALL TIMES. EACH CONTRACTOR SHALL REFER TO THE GENERAL REQUIREMENTS OF THE CONTRACT. THE NOTES AND SYMBOLS INDICATED ON THE DRAWINGS ARE FOR THE GUIDANCE OF ALL TRADES INVOLVED IN THE PROJECT AND MUST BE FOLLOWED TO EXECUTE THE WORK AS INTENDED. IF DISCREPANCIES OCCUR, CONTACT THE VA PROJECT ENGINEER THRU THE CONTRACTING OFFICER FOR CLARIFICATION BEFORE PROCEEDING.
5. EACH CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHERS. HE SHALL KEEP HIMSELF INFORMED OF THE PROGRESS AND DETAIL DEVELOPMENT OF THE WORK OF OTHERS AND SHALL BE RESPONSIBLE FOR COORDINATING AND EXPEDITING HIS WORK WITH OTHERS SO THAT THE PROGRESS OF THE TOTAL WORK SHALL BE KEPT ON SCHEDULE.
6. ALL WORK SHALL BE PERFORMED IN COMPLETE COMPLIANCE WITH ALL GOVERNING CODES AND STANDARDS.
7. EXISTING CONDITIONS SHOWN HAVE BEEN BASED ON VISUAL OBSERVATION AND/OR AVAILABLE DRAWING INFORMATION, AND MAY BE AT VARIANCE WITH ACTUAL WORK IN PLACE. THE CONTRACTOR SHALL TAKE ALL NECESSARY FIELD MEASUREMENTS AND FIELD VERIFY ALL CONDITIONS AFFECTING THE EXECUTION OF THE WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE WORK SHOWN ON THE CONTRACT DOCUMENTS WHICH MAY IMPACT THE PROGRESS OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER IN WRITING FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
8. EACH CONTRACTOR AND/OR TRADE, FITTING OR PLACING HIS WORK INTO OR ON THE WORK OF OTHERS DOES SO WITH THE UNDERSTANDING THAT THE INSTALLATION OF HIS WORK CONSTITUTES HIS ACCEPTANCE OF THE SUITABILITY OF THE WORK IN PLACE. IF THE WORK OF OTHERS IS NOT ACCEPTABLE, HE SHALL NOTIFY THE VA PROJECT ENGINEER AND SUCH WORK SHALL BE CORRECTED. ANY NEW WORK INSTALLED IN UNSUITABLE EXISTING WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OR TRADE INSTALLING THE NEW WORK. NO CLAIMS FOR ADDITIONAL COMPENSATION FOR CORRECTING WORK INSTALLED IN UNSUITABLE EXISTING CONDITIONS WILL BE CONSIDERED.
9. REFER TO ARCHITECTURAL FIRE-RATED PARTITION PLAN(S) FOR LOCATIONS AND FIRE-RATINGS OF NEW AND EXISTING WALL ASSEMBLIES. ALL PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES SHALL BE PROTECTED AND/OR FIRE-STOPPED AS REQUIRED TO MAINTAIN FIRE-RATINGS INDICATED. COORDINATE WITH ALL TRADES TO ENSURE FIRE-RATED PENETRATION REQUIREMENTS AND DETAILS ARE MET.
10. ANNULAR SPACE OF ALL PIPE, CONDUIT, DUCT & OTHER SIMILAR PENETRATIONS OF FIRE RATED ASSEMBLIES SHALL BE FIRESTOPPED. IN ADDITION, PENETRATIONS THROUGH 0-HOUR RATED WALLS & FLOORS SHALL BE FIRESTOPPED TO RETARD PASSAGE OF FIRE & SMOKE.
11. THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. DUCT SIZES ARE NET INSIDE DIMENSIONS.
12. ACCESS PANELS IN NON ACCESSIBLE SUSPENDED CEILINGS SHALL BE PROVIDED FOR ALL VALVES, TRAPS, DAMPERS, CLEANOUTS, FLOW METERS, CONTROLS, ETC.
13. FOR TYPICAL STEAM, WATER AND REFRIGERANT PIPING CONNECTIONS TO EQUIPMENT, SEE STANDARD DETAILS AND PIPING SCHEMATICS.
14. DIFFUSER SIZES SHOWN ON FLOOR PLANS ARE NECK SIZES. REGISTER AND GRILLE SIZES SHOWN ARE FACE SIZES. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.
15. ALL ABANDONED EXTRANEOUS PIPING, DUCTWORK, SUPPORTS, CONTROLS, ETC. SHALL BE REMOVED.
16. WHERE DUCTS OR PIPES ARE REMOVED THRU WALL/FLOOR/ROOF THAT IS TO REMAIN, PATCH WALL/FLOOR/ROOF OPENING TO MATCH EXISTING WHERE OPENING IS NOT RE-USED.
17. ALL CUTTING AND PATCHING REQUIRED FOR THIS PROJECT SHALL BE INCLUDED IN THE CONTRACT. REFINISH ANY SURFACE DISTURBED UNDER THIS WORK TO MATCH EXISTING.
18. IN GENERAL, KEEP DUCT AND PIPING MAINS NEXT TO UNDERSIDE OF STRUCTURE.
19. THE CONTRACT DRAWINGS ARE NOT INTENDED TO SHOW EVERY VERTICAL OR HORIZONTAL OFFSET WHICH MAY BE NECESSARY TO COMPLETE THE SYSTEMS. COORDINATE WORK IN ADVANCE WITH ALL OTHER TRADES AND REPORT IMMEDIATELY ANY DIFFICULTIES WHICH CAN BE ANTICIPATED.
20. HEPA FILTERED EXHAUST IS REQUIRED TO MAINTAIN A MINIMUM OF 0.01" W.G. NEGATIVE PRESSURE IN CONSTRUCTION AREAS. COORDINATE WITH GENERAL CONTRACTOR AND THE VA PROJECT ENGINEER.
21. TERMINATE PIPING AND DUCTWORK BELOW FLOORS, ABOVE CEILINGS, ETC., IN CONCEALED SPACES. ALL CUTTING AND PATCHING SHALL MATCH EXISTING FINISHES.
22. ALL EXISTING DUCTWORK, PIPING, EQUIPMENT, CONTROLS, ETC. SHOWN DASHED ON REMOVAL PLAN(S) SHALL BE REMOVED. THE MAJORITY OF WORK TO BE REMOVED IS SHOWN. REMOVE ALL INCIDENTAL AND/OR ABANDONED EQUIPMENT, DUCTWORK, PIPING, ETC. THAT MAY NOT BE SHOWN BUT IS ASSOCIATED WITH THE REMOVAL WORK.
23. WHERE EXISTING HVAC UTILITIES IN SERVICE WILL BE DISRUPTED DURING THE CONSTRUCTION OF THIS PROJECT, THIS WORK SHALL BE PERFORMED ON WEEKENDS OR WEEK NIGHTS, IF REQUIRED BY THE VA PROJECT ENGINEER. DOWNTIME SHALL BE KEPT TO A MINIMUM, AND SHALL BE COORDINATED AND SCHEDULED WELL IN ADVANCE WITH THE VA PROJECT ENGINEER.
24. RUNOUT PIPING TO TERMINAL UNITS AND FAN COIL UNITS SHALL BE 0.75" SIZE UNLESS OTHERWISE NOTED ON PLANS OR IN SCHEDULES.
25. APPROXIMATE ELEVATIONS NOTED ARE TO THE CENTER OF THE PIPE AND BOTTOM OF DUCT.
26. PROVIDE ALL ROOFING PENETRATION, REPAIR AND REINFORCEMENT IN THE EXISTING BUILDING FOR WORK INDICATED. ENGAGE A ROOFING SUB-CONTRACTOR TO PERFORM THE ROOFING WORK. WHERE ROOFING WORK IS REQUIRED, THE EXISTING TREMCO ROOFING MEMBRANE AND INSULATION SHALL BE CUT, REMOVED, AND RESTORED AS REQUIRED TO ATTAIN A WATERTIGHT CONDITION. THE ROOFING SUB-CONTRACTOR SHALL BE A CERTIFIED INSTALLER FOR SUCH INSTALLATION TO MAINTAIN THE EXISTING WARRANTY ON THE ROOF.

AIR DISTRIBUTION DEVICES

SYMBOL	DESCRIPTION	TYPE MOUNTING LAY-IN	TYPE MOUNTING SURFACE	MATERIAL STEEL	MATERIAL ALUM.	FINISH E.C.L.	FINISH W.B.E.	ACCESSORIES	SEE NOTE
CD1	LOUVERED FACE 3-WAY DISCHARGE DIFFUSER	◦			◦		◦		2
CG1	EGGCRATE CEILING GRILLE	◦			◦		◦		
TR1	ADJUSTABLE 0.75" AIRFOIL BLADE DOUBLE DEFLECTION SUPPLY GRILLE		◦		◦		◦		1

NOTES:
1 HORIZONTAL FRONT BLADES.
2 24x24 MODULE WITH 18x18 NECK AND SQUARE TO ROUND ADAPTER.

INDEX OF DRAWINGS - HVAC

Sheet Number	Sheet Name
M-100	INDEX, LEGEND AND GENERAL NOTES
MD-102	SECOND FLOOR PLAN HVAC REMOVALS
M-102	SECOND FLOOR PLAN HVAC NEW WORK
M-103	THIRD FLOOR PLAN HVAC NEW WORK
M-105	FIFTH FLOOR PLAN HVAC NEW WORK
M-106	ROOF PLAN HVAC NEW WORK
M-501	DETAILS
M-502	SIEMENS SUPPLEMENT MRI
M-503	SIEMENS SUPPLEMENT MRI

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Revisions	Date

CONSULTANTS:

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Drawing Title: INDEX, LEGEND AND GENERAL NOTES

Approved: Project Director

Project Title: MRI SITE PREP

Location: Cincinnati, Ohio

Date: 10/30/2015 | Checked: DLE | Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00

Building Number: 01

Drawing Number: M-100

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Office of Construction and Facilities Management
Department of Veterans Affairs

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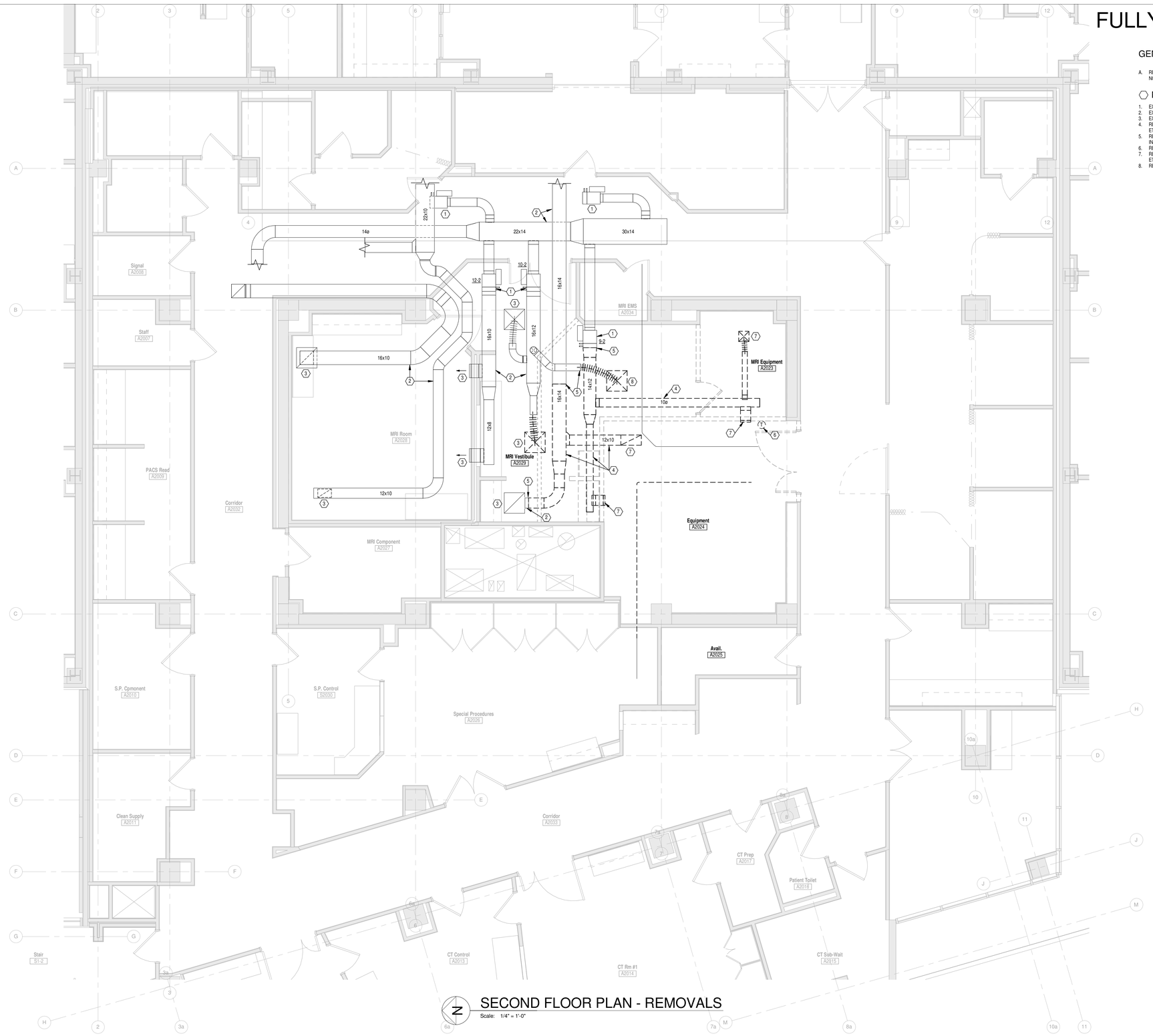
GENERAL NOTES

A. REFER TO SHEET M-100 FOR INDEX, LEGEND AND ADDITIONAL GENERAL NOTES.

NOTES

1. EXISTING AIR TERMINAL UNIT TO REMAIN.
2. EXISTING DUCTWORK TO REMAIN.
3. EXISTING AIR DEVICE TO REMAIN.
4. REMOVE EXISTING DUCTWORK AND ASSOCIATED DAMPERS, HANGERS, ETC.
5. REMOVE EXISTING DUCTWORK BACK TO THIS POINT FOR RECONNECTION IN NEW WORK.
6. REMOVE EXISTING THERMOSTAT AND ASSOCIATED WIRING, ETC.
7. REMOVE EXISTING AIR DEVICE AND ASSOCIATED DUCTWORK, HANGERS, ETC.
8. REMOVE EXISTING AIR DEVICE FOR RELOCATION IN NEW WORK.



SECOND FLOOR PLAN - REMOVALS

Scale: 1/4" = 1'-0"

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Revisions	Date

CONSULTANTS:

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Drawing Title: SECOND FLOOR PLAN HVAC REMOVALS

Approved: Project Director

Project Title: MRI SITE PREP

Location: Cincinnati, Ohio

Date: 10/30/2015 | Checked: DLE | Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00

Building Number: 01

Drawing Number: MD-102

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Department of Veterans Affairs

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GENERAL NOTES

A. REFER TO SHEET M-100 FOR INDEX, LEGEND AND ADDITIONAL GENERAL NOTES.

NOTES

1. EXISTING AIR TERMINAL UNIT TO REMAIN.
2. EXISTING DUCTWORK TO REMAIN.
3. EXISTING AIR DEVICE TO REMAIN.
4. BALANCE EXISTING AIR TERMINAL UNIT TO INDICATED CFM.
5. EXTEND QUENCH VENT TO SIEMENS MRI PER MANUFACTURERS RECOMMENDATIONS. REFER TO SIEMENS SHEET M-101 INCLUDED ON SHEET M-502 OF THIS SET FOR CONVENIENCE.
6. EXTEND QUENCH VENT UP THRU EXISTING OPENING. REFER TO SHEET M-103 FOR CONTINUATION. REFER TO SHEET M-106 FOR QUENCH VENT PIPING DETAIL.
7. WAVE GUIDE AT RF SHIELDING BY SHIELDING CONTRACTOR. PROVIDE DIELECTRIC ISOLATOR ABOVE WAVE GUIDE AND KEEP ALL FOIL-BACKED INSULATION A MINIMUM OF 1" AWAY FROM RF SHIELDING. COORDINATE SIZE, LOCATION OF OPENINGS, INSTALLATION , ETC. WITH SHIELDING CONTRACTOR.
8. DUCT SYSTEM DESIGNATED BY CROSS-HATCHING SHALL BE ALUMINUM, INCLUDING AIR DEVICES, DAMPERS, FASTENERS, SUPPORTS, ETC.
9. DUCT-MOUNTED SPACE TEMPERATURE SENSOR.
10. INTERLOCK AUTOMATIC RETURN AIR DAMPER WITH OXYGEN SENSOR AND EMERGENCY VENTING EXHAUST FAN, TO CLOSE WHEN EMERGENCY FAN STARTS.
11. PROVIDE OXYGEN DEFICIENCY MONITOR WITH LASER DIODE TECHNOLOGY FOR CONTROL OF RETURN DUCT SHUTOFF DAMPER AND EMERGENCY EXHAUST FAN EF-A2001B. MOUNT ON WALL BELOW CEILING PER MANUFACTURER'S INSTRUCTIONS.
12. BALANCE EXISTING AIR DEVICE TO INDICATED CFM.
13. EXTEND EMERGENCY EXHAUST DUCT UP TO THIRD FLOOR. REFER TO SHEET M-103 FOR CONTINUATION.
14. EXTEND 2.5" GLYCOL CHILLED WATER PIPING TO SIEMENS/KRAUSS INTERFACE PANEL PER MANUFACTURER'S INSTRUCTIONS. REFER TO SIEMENS SHEET M-101 INCLUDED ON SHEET M-502 OF THIS SET FOR CONVENIENCE.
15. EXTEND 2.5" GLYCOL CHILLED WATER PIPING UP TO THIRD FLOOR. REFER TO SHEET M-503 FOR CONTINUATION.
16. RELOCATE AIR DEVICE TO THIS LOCATION. EXTEND/MODIFY DUCTWORK AS REQUIRED. BALANCE TO INDICATED CFM.

SECOND FLOOR PLAN - NEW WORK

Scale: 1/4" = 1'-0"

Revisions	Date

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Drawing Title: SECOND FLOOR PLAN HVAC NEW WORK

Approved: Project Director

Project Title: MRI SITE PREP

Location: Cincinnati, Ohio

Date: 10/30/2015 | Checked: DLE | Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00

Building Number: 01

Drawing Number: M-102

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Office of Construction and Facilities Management
Department of Veterans Affairs

A = three inches = one foot
B = one and one-half inches = one foot
C = one inch = one foot
D = three-quarters inch = one foot
E = one-half inch = one foot
F = three-eighths inch = one foot
one-quarter inch = one foot
one-eighth inch = one foot

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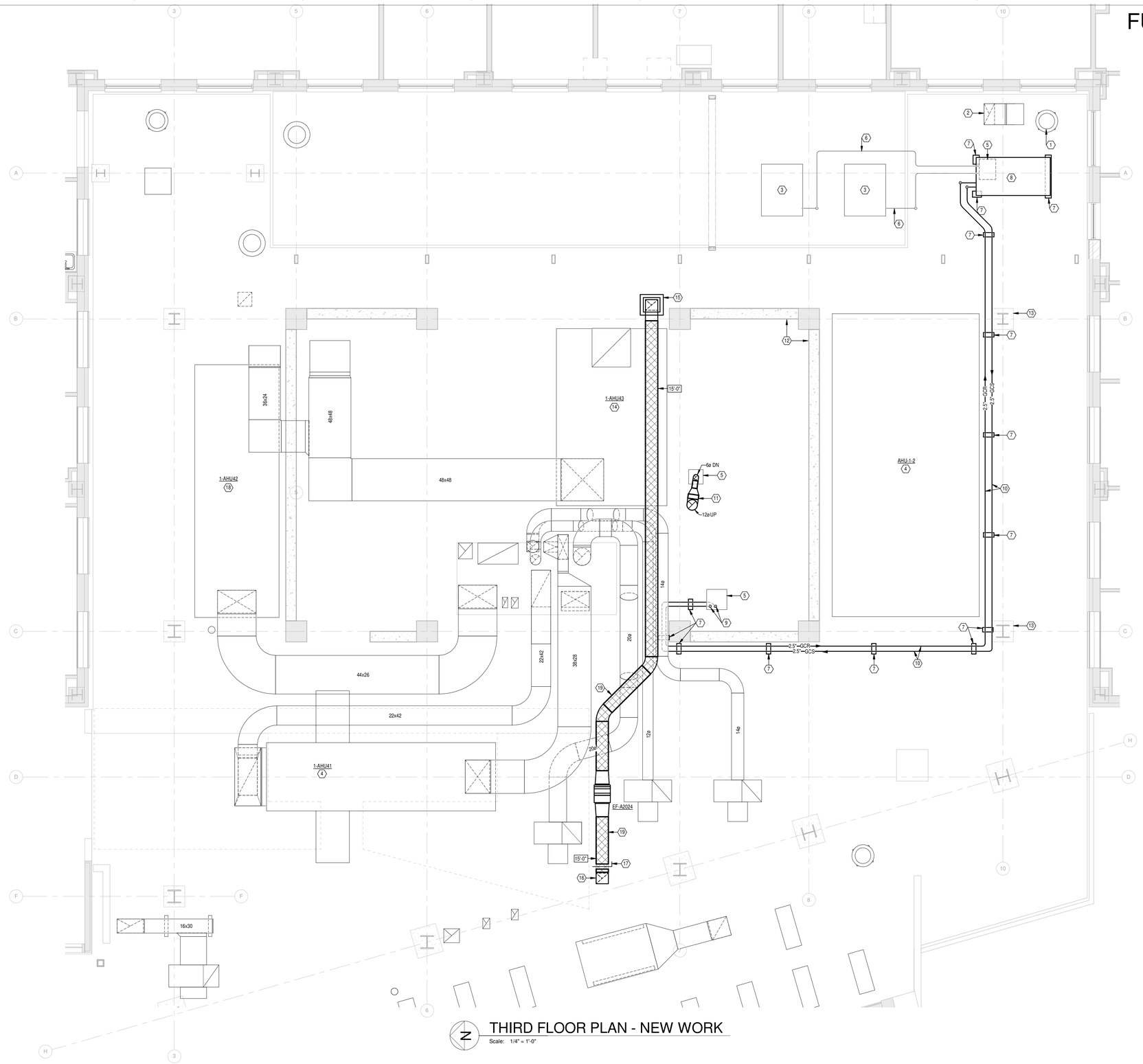
GENERAL NOTES

A. REFER TO SHEET M-100 FOR INDEX, LEGEND AND ADDITIONAL GENERAL NOTES.

NOTES

1. EXISTING EXHAUST FAN TO REMAIN.
2. EXISTING DUCTWORK TO REMAIN.
3. EXISTING CONDENSING UNIT TO REMAIN.
4. EXISTING AIR HANDLING UNIT TO REMAIN.
5. EXISTING PIPE PENETRATION ROOF CURB TO REMAIN.
6. EXISTING PIPING TO REMAIN.
7. PROVIDE ROOF EQUIPMENT SUPPORT CURB. REFER TO DETAIL ON SHEET M-501.
8. RECEIVE AND INSTALL NEW KKT KRAUS MRI CHILLER FURNISHED BY SIEMENS.
9. 2.5" GLYCOL CHILLED WATER UP FROM SECOND FLOOR THRU EXISTING PIPING PENETRATION ROOF CURB. REFER TO SHEET M-102 FOR CONTINUATION.
10. PROVIDE ALUMINUM JACKET ON ALL EXTERIOR PIPING AS SPECIFIED.
11. PROVIDE QUENCH VENT PER DETAIL ON SHEET M-105.
12. SHEAR WALL BEING PROVIDED UNDER VA PROJECT #539-328. COORDINATE WITH COR.
13. COLUMN BEING PROVIDED UNDER VA PROJECT #539-328. COORDINATE WITH COR.
14. AIR HANDLING UNIT BEING PROVIDED UNDER VA PROJECT #539-328. COORDINATE WITH COR.
15. EMERGENCY EXHAUST DUCT UP FROM SECOND FLOOR. PROVIDE DUCT PENETRATION ROOF CURB. REFER TO SHEET M-102 FOR CONTINUATION.
16. TURN DUCT DOWN AND CONNECT TO PLENUM CASING PROVIDED UNDER VA PROJECT #539-328. IF PLENUM CASING NOT PROVIDED IN TIME, TURN DUCT DOWN AND TERMINATE WITH BIRDSCREEN.
17. PROVIDE GRAVITY BACKDRAFT DAMPER FULL SIZE OF EXHAUST DUCT. INSULATE DUCT BETWEEN DAMPER AND LOUVERED PLENUM.
18. AIR HANDLING UNIT BEING PROVIDED UNDER VA PROJECT #539-15-102. COORDINATE WITH COR.
19. PROVIDE ALUMINUM DUCTWORK.

NOTE: THIRD FLOOR IS CURRENTLY A ROOF. VA PROJECT #539-328 (IN CONSTRUCTION) IS ADDING FIFTH FLOOR AND TURNING THIRD FLOOR INTO A TWO STORY MECHANICAL ROOM. STRUCTURE SHOULD BE INSTALLED PRIOR TO CONSTRUCTION STARTING FOR THIS PROJECT.



THIRD FLOOR PLAN - NEW WORK

Scale: 1/4" = 1'-0"

Revisions	Date

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HEAPY PROJECT No.: 2015-04016 FIRM LICENSE No.: 01528

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ARCHITECT/ENGINEERS:

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Drawing Title: THIRD FLOOR PLAN HVAC NEW WORK

Approved: Project Director

Project Title: MRI SITE PREP

Location: Cincinnati, Ohio

Date: 10/30/2015 | Checked: DLE | Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00

Building Number: 01

Drawing Number: M-103

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Office of Construction and Facilities Management
Department of Veterans Affairs

FULLY SPRINKLERED

GENERAL NOTES

A. REFER TO SHEET M-100 FOR INDEX, LEGEND AND ADDITIONAL GENERAL NOTES.

NOTES

1. QUENCH VENTS UP AND DOWN. REFER TO SHEETS M-102 AND M-106 FOR CONTINUATION.

NOTE: FIFTH FLOOR CONSTRUCTION IS BEING PROVIDED UNDER VA PROJECT #539-328 SIMULTANEOUSLY WITH THIS PROJECT. STRUCTURE SHOULD BE INSTALLED PRIOR TO CONSTRUCTION STARTING FOR THIS PROJECT.

FIFTH FLOOR PLAN - NEW WORK

Scale: 1/4" = 1'-0"

three inches = one foot
one and one-half inches = one foot
one inch = one foot
three-quarters inch = one foot
one-half inch = one foot
three-eighths inch = one foot
one-quarter inch = one foot
one-eighth inch = one foot

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Revisions	Date

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Location: Cincinnati, Ohio

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Building Number: 01

Drawing Number: M-105

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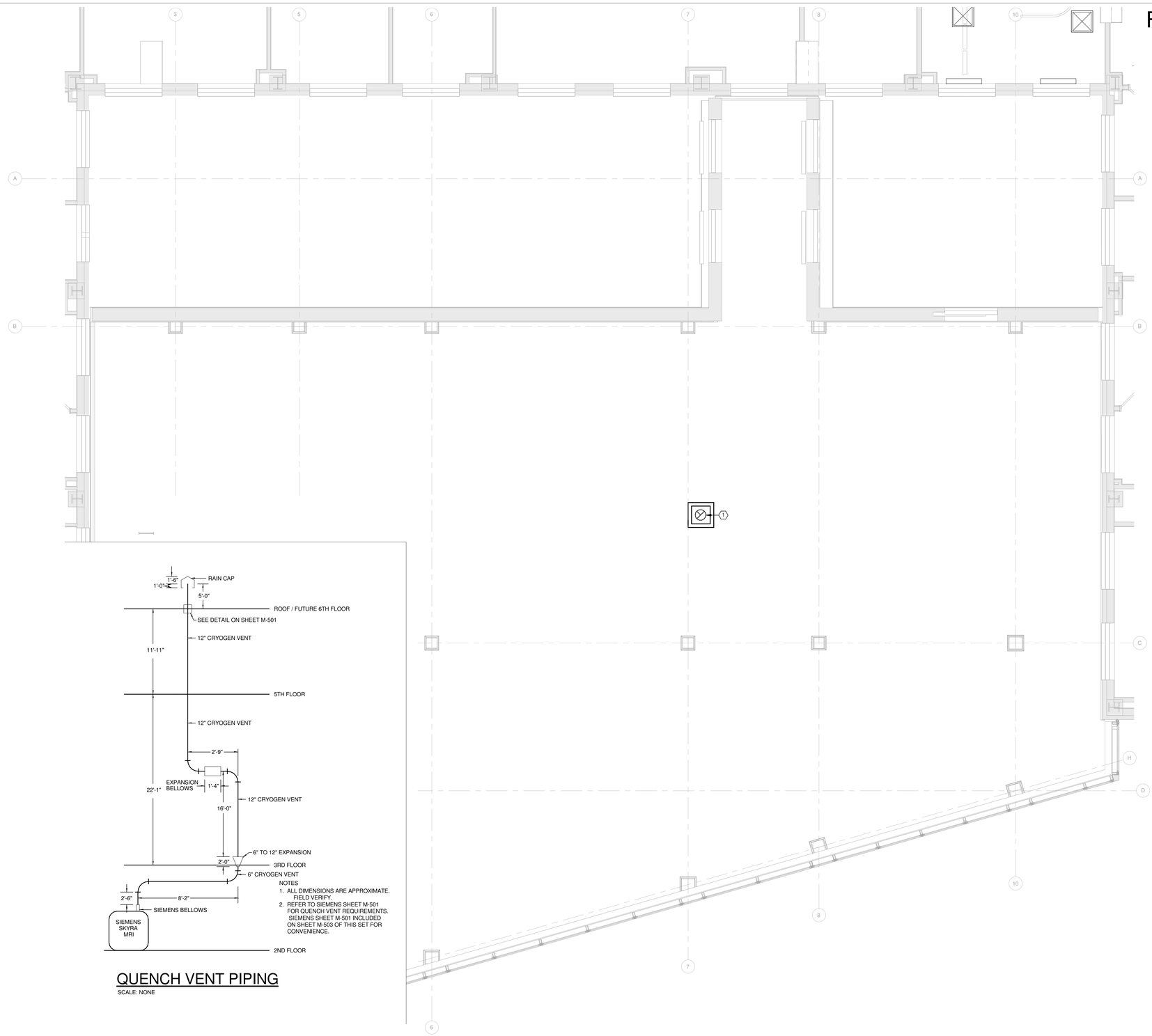
GENERAL NOTES

A. REFER TO SHEET M-100 FOR INDEX, LEGEND AND ADDITIONAL GENERAL NOTES.

⬡ NOTES

1. EXTEND QUENCH VENT UP THRU ROOF.



ROOF PLAN - NEW WORK

Scale: 1/4" = 1'-0"

QUENCH VENT PIPING

SCALE: NONE

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Building Number: 01

Drawing Number: M-106

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one inch = one foot
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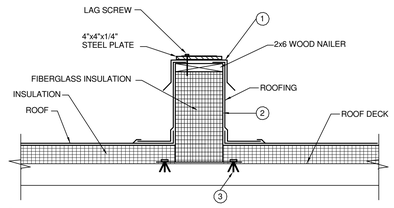
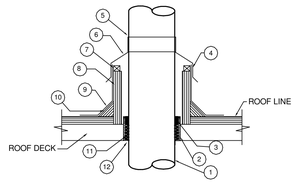


1. 18 GAUGE GALVANIZED STEEL COUNTER-FLASHING.
2. WELDED 14 GAUGE EQUIPMENT SUPPORT CURB, MEETING ASTM A-446, 525, 526 AND 527 REQUIREMENTS, WITH WELDED CORNERS WITH SEAMS JOINED BY CONTINUOUS WELDS. CURB SHALL BE INTERNALLY REINFORCED WITH BULKHEADS AND SPREADERS, 24" ON CENTER TO MEET LOAD RATING OF EQUIPMENT. CURB TO EXTEND 6" BEYOND EQUIPMENT. REFER TO FLOOR PLANS FOR HEIGHT.
3. SECURE CURB TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (METAL DECK AND BAR JOIST ROOF), 12" O.C.

GENERAL NOTE:

1. THIS DETAIL IS NOT INTENDED FOR ROOFTOP AHU SUPPORT. REFER TO STRUCTURAL DRAWINGS FOR REQUIREMENTS OF ROOFTOP AHU SUPPORT.

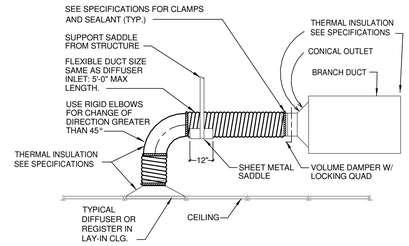
EQUIPMENT/DUCT SUPPORT ROOF CURB



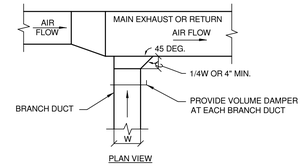
1. QUENCH VENT REFER TO SHEET M502
2. STEEL SLEEVE
3. FLEXIBLE SEALANT
4. NO DIRECTION CONNECTION
5. CONTINUOUS WELD
6. STAINLESS STEEL HOOD
7. WOOD NAILER
8. SQUARE CURB
9. BASE FLASHING
10. 4" CANT STRIP (IF REQUIRED)
11. PACKED INSULATION
12. METAL ESCUTCHEON FORCE FIT TO PIPE

QUENCH VENT THRU ROOF

SCALE: NONE

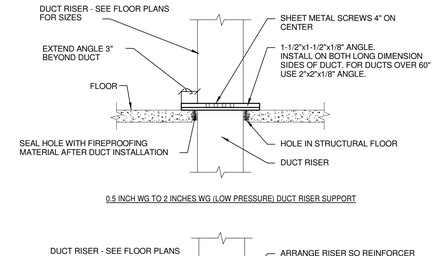


FLEXIBLE AIR DUCT CONNECTOR

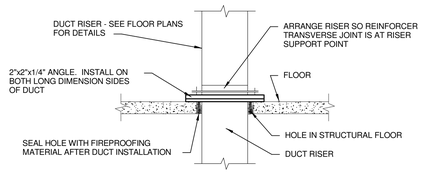


PLAN VIEW

EXHAUST OR RETURN BRANCH DUCTWORK



0.5 INCH WG TO 2 INCHES WG (LOW PRESSURE) DUCT RISER SUPPORT



2 INCHES WG TO 4 INCHES WG (HIGH AND MEDIUM PRESSURE) DUCT RISER SUPPORT

NOTE:
ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND FAN ROOM FLOORS SHALL BE PROVIDED WITH A 3" HIGH CONCRETE CURB AROUND OPENING FOR DUCT.

DUCT RISER SUPPORTS

NEW MRI CONTROLS

1. EMERGENCY EXHAUST FAN

1.1 PROVIDE OXYGEN SENSOR ON WALL OF NEW MRI SCANNING ROOM. COORDINATE LOCATION WITH SIEMENS AND COR.

1.2 EXHAUST FAN EF-A2001B SHALL BE STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" SHALL BE USED ONLY FOR MAINTENANCE.

1.3 EXHAUST FAN EF-A2001B SHALL OPERATE IF OXYGEN LEVEL OF MRI SCANNING ROOM DROPS BELOW 20.0% (ADJUSTABLE). FAN SHALL ALSO OPERATE IF ALARM IS PRESENT FROM MRI CONTROL PANEL.

1.4 AUTOMATIC DAMPER IN RETURN DUCT SHALL CLOSE IF EF-A2001B OPERATES.

2. MRI CONTROL PANEL INTERFACE

2.1 EXTEND ALARM SIGNAL FROM MRI CONTROL PANEL TO DDC SYSTEM.

EXISTING MRI CONTROLS

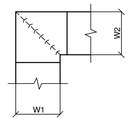
1. EMERGENCY EXHAUST FAN

1.1 PROVIDE OXYGEN SENSOR ON WALL OF EXISTING MRI SCANNING ROOM. COORDINATE LOCATION WITH SIEMENS AND COR.

1.2 EXHAUST FAN EF-5-2 OPERATE IF OXYGEN LEVEL OF MRI SCANNING ROOM DROPS BELOW 20.0% (ADJUSTABLE). FAN SHALL ALSO OPERATE IF ALARM IS PRESENT FROM MRI CONTROL PANEL.

2. MRI CONTROL PANEL INTERFACE

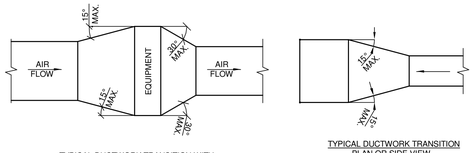
2.1 EXTEND ALARM SIGNAL FROM MRI CONTROL PANEL TO DDC SYSTEM.



NOTES:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1 1/2" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20", VANES SHALL BE DOUBLE VANE TYPE.

DUCTWORK SQUARE VANE ELBOWS

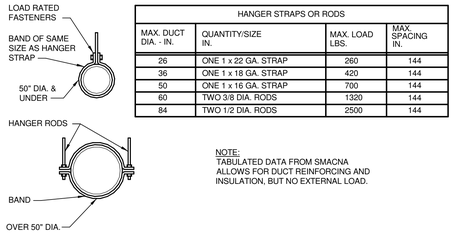


TYPICAL DUCTWORK TRANSITION WITH EQUIPMENT MOUNTED IN DUCT PLAN OR SIDE VIEW

TYPICAL DUCTWORK TRANSITION PLAN OR SIDE VIEW

NOTE:
UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

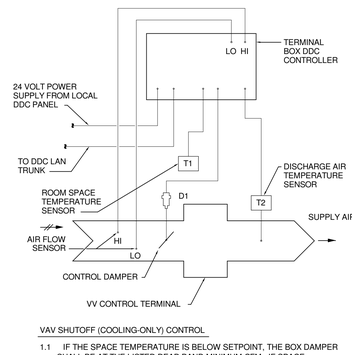
DUCTWORK TRANSITIONS



HANGER STRAPS OR RODS			
MAX. DUCT DIA. - IN.	QUANTITY/SIZE IN.	MAX. LOAD LBS.	MAX. SPACING IN.
26	ONE 1 x 22 GA. STRAP	260	144
36	ONE 1 x 18 GA. STRAP	420	144
50	ONE 1 x 16 GA. STRAP	700	144
60	TWO 3/8 DIA. RODS	1320	144
84	TWO 1/2 DIA. RODS	2500	144

NOTE:
TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

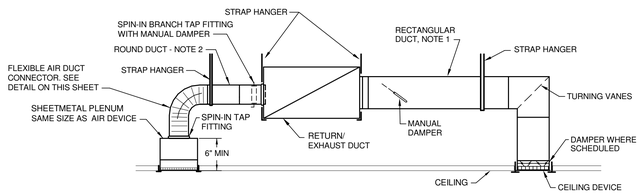
ROUND DUCT HANGERS



VAV SHUTOFF (COOLING-ONLY) CONTROL

1.1 IF THE SPACE TEMPERATURE IS BELOW SETPOINT, THE BOX DAMPER SHALL BE AT THE LISTED DEAD BAND MINIMUM CFM. IF SPACE TEMPERATURE RISES ABOVE THE COOLING SETPOINT, THE CONTROL SHALL MODULATE THE BOX DAMPER BETWEEN THE LISTED DEAD BAND MINIMUM CFM AND THE LISTED COOLING MAXIMUM CFM TO SATISFY THE SPACE COOLING SETPOINT. BOX CONTROLS SHALL REVERSE ACTION DURING "WARM-UP" CYCLES.

AIR TERMINAL UNIT CONTROLS

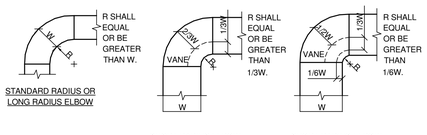


NOTES:

1 BRANCH DUCT TAKE-OFF WITH MANUAL DAMPER.

2 BRANCH DUCT SIZES, UNLESS NOTED ON PLANS ARE TO BE SIZED AS FOLLOWS:
100 CFM AND LESS - 6" DIA.
101 CFM TO 250 CFM - 8" DIA.
251 CFM TO 400 CFM - 10" DIA.
401 CFM TO 700 CFM - 12" DIA.

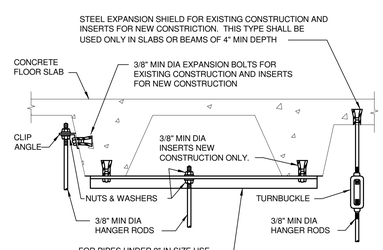
RETURN OR EXHAUST GRILLE/REGISTER CONNECTION



NOTES:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

DUCTWORK RADIUS ELBOWS



SECURING HANGER RODS IN CONCRETE

Revisions	Date

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Drawing Title: DETAILS

Approved: Project Director

Project Title: MRI SITE PREP

Location: Cincinnati, Ohio

Date: 10/30/2015 | Checked: DLE | Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00

Building Number: 01

Drawing Number: M-501

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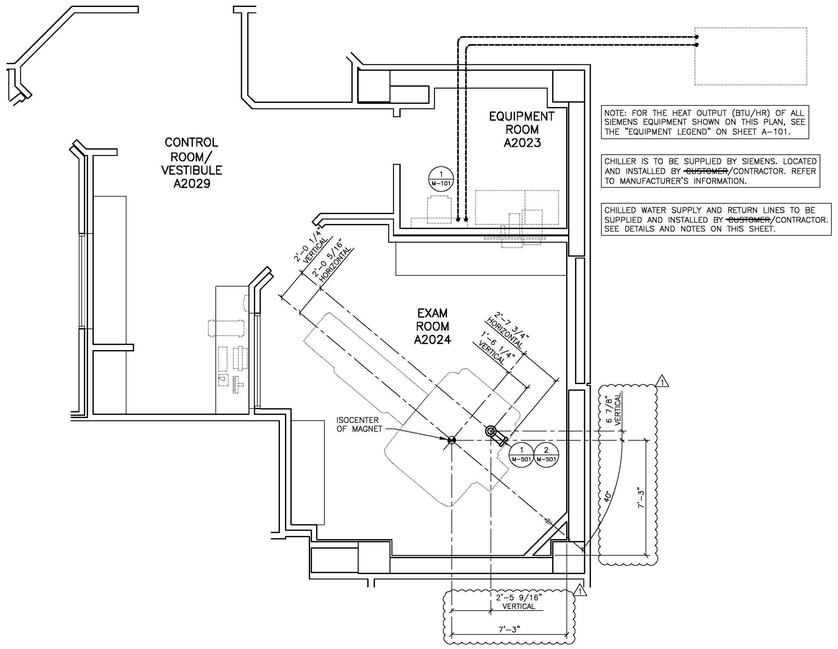


NOTE: FOR THE HEAT OUTPUT (BTU/HR) OF ALL SIEMENS EQUIPMENT SHOWN ON THIS PLAN, SEE THE "EQUIPMENT LEGEND" ON SHEET A-101.

CHILLER IS TO BE SUPPLIED BY SIEMENS. LOCATED AND INSTALLED BY ~~CUSTOMER~~/CONTRACTOR. REFER TO MANUFACTURER'S INFORMATION.

CHILLED WATER SUPPLY AND RETURN LINES TO BE SUPPLIED AND INSTALLED BY ~~CUSTOMER~~/CONTRACTOR. SEE DETAILS AND NOTES ON THIS SHEET.

MECHANICAL PLAN

~~SCALE: 1/4" = 1'-0"~~

ENVIRONMENTAL REQUIREMENTS

1) AIR CONDITIONING IS TO PROVIDE A TEMPERATURE OF 70°F ±5°F IN THE CONTROL & EQUIPMENT ROOMS 65°F–71°F IN EXAM ROOM. RELATIVE HUMIDITY OF 40–60% (NON–CONDENSING) IS REQUIRED EXAMINATION ROOM AND 40–80% (NON–CONDENSING) IN ALL OTHER AREAS WHERE SIEMENS EQUIPMENT IS INSTALLED. THESE CONDITIONS ARE TO BE MET AT ALL TIMES; 24 HOURS A DAY, 7 DAYS A WEEK.

2) A DEDICATED AIR CONDITIONING AND HUMIDIFICATION SYSTEM IS RECOMMENDED FOR THE EXAM ROOM. A MINIMUM AIR EXCHANGE RATE OF 6 TIMES PER HOUR FOR THE EXAM ROOM IS REQUIRED. IT IS RECOMMENDED TO INSTALL A FRESH AIR SYSTEM WITH 30%–50% FRESH AIR INTAKE.

AIR SUPPLY AND RETURN ABOVE THE FINISHED CEILING IN THE EXAM ROOM IS RECOMMENDED. EACH ROOM SHOULD HAVE A DEDICATED CONTROL AND SENSOR TO MONITOR AND ADJUST THE AIR.

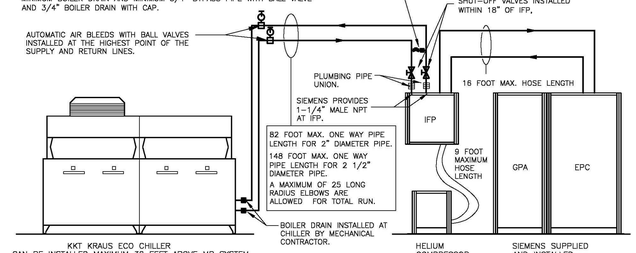
3) THE HEAT INTO THE EXAM ROOM IS LESS THAN 10,236 BTU/HR. THE HEAT INTO THE EQUIPMENT ROOM IS LESS THAN 3,412 BTU/HR. THIS HEAT DISSIPATION IS FROM THE SIEMENS EQUIPMENT ONLY, AUXILIARY SUPPORT EQUIPMENT (ie. UPS) AND LIGHTING MUST BE CONSIDERED FOR TOTAL HEAT LOADS.

4) IT IS IMPORTANT FOR FRESH AIR INTAKE SYSTEMS TO EXHAUST AIR DIRECTLY OUT OF THE BUILDING. THE EXHAUST AIR MUST NOT BE DEFLECTED INTO ANOTHER ROOM. THE MAGNET ROOM EXHAUST AIR SHOULD BE INSTALLED AT LEAST 6'–6" ABOVE FINISHED FLOOR.

5) THE AIR INTAKE OF THE AIR CONDITIONING SYSTEM MUST NOT BE LOCATED IN THE VICINITY OF THE QUENCH VENT EXHAUST.

6) IF THE INPUT DRAWS UPON AIR FROM OUTSIDE THE BUILDING, IT IS RECOMMENDED TO INSTALL AN ON–SITE FILTER TO REMOVE DUST PARTICLES GREATER THAN 10 MICRONS.

7) DO NOT LOCATE ANY HVAC DIFFUSERS ABOVE THE MAGNET. THERE SHALL NOT BE AIR BLOWING DIRECTLY ON THE MAGNET.



NOTES:

ALL PIPING AND PLUMBING FIXTURES SHALL BE FURNISHED, INSTALLED, PRESSURE TESTED AND CHARGED BY THE MECHANICAL CONTRACTOR PRIOR TO THE DELIVERY AND INSTALLATION OF THE SIEMENS SUPPLIED AND INSTALLED EQUIPMENT UNLESS SPECIFIED OTHERWISE.

AT THE HIGHEST POINT OF THE WATER SUPPLY PIPE FROM THE KRAUS CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR.

SYSTEM MUST BE PROVEN TO BE FREE FROM LEAKAGE.

THE MECHANICAL ENGINEER OF RECORD SHALL BE ULTIMATELY RESPONSIBLE FOR THE SITE SPECIFIC DESIGN AND SPECIFICATION OF THE MECHANICAL AND PIPING SYSTEMS AS SHOWN AND SHALL BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES. ALL WORK SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR AND SHALL BE SUBJECT TO COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES.

THE SUPPLY AND RETURN PIPES FROM THE CHILLED WATER SUPPLY TO THE FP MUST BE LABELED TO SHOW FLOW DIRECTION AND CONTENT (WATER/GLYCOL).

A TAP WATER SUPPLY MUST BE AVAILABE WITHIN 45' OF THE IFP AND CHILLER CONNECTION FOR FILLING THE CIRCUIT.

1 PIPING SCHEMATIC FOR CHILLED WATER–KRAUS ECO CHILLER — SCALE: NONE

CHILLED WATER SUPPLY

A CHILLED WATER SUPPLY IS REQUIRED TO THE MRI SYSTEM 24 HOURS A DAY, YEAR ROUND FOR THE COLD HEAD AND GRADIENT SYSTEMS. THIS CAN BE PROVIDED BY A DEDICATED KRAUS ECO CHILLER AND INTERFACE PANEL. CHILLED WATER CAN ALTERNATIVELY BE SUPPLIED BY OTHER MEANS IN COMBINATION WITH A SEPARATOR CABINET PROVIDED BY SIEMENS.

THE PIPE SIZE BETWEEN THE KRAUS CHILLER AND INTERFACE PANEL, OR BETWEEN THE WATER SUPPLY AND SEP MUST BE 2 INCH UP TO 82 FEET, 2–1/2 INCH UP TO 148 FEET, CONSULT KKT KRAUS FOR LONGER PIPE. PERMISSIBLE MATERIALS THAT CAN BE USED FOR THE PIPING ARE: STAINLESS STEEL (V2A, V4A), NON–FERROUS METAL (COPPER, BRASS), SYNTHETIC MATERIAL, PLASTICS, BRAZING SOLDER, HARD SOLDER, OR FITTING SOLDER TYPE 3 AND 4. THERE ARE MATERIALS THAT MAY CAUSE DAMAGE TO THE COOLING SYSTEM AND CANNOT BE USED, THESE MATERIALS ARE ALUMINUM, IRON, CARBON STEEL, ZINC, ZINC PLATED STEEL, OR STANDARD STEEL PIPES.

THESE REQUIREMENTS ARE REQUIRED FOR NEW INSTALLATIONS, IF EXISTING WATER PIPES COMPLY WITH SIEMENS WATER SPECIFICATIONS, THEY DO NOT NEED TO BE REPLACED.

NORMAL TAP WATER MUST BE AVAILABLE FOR FILLING THE SECONDARY WATER CIRCUIT. THERE SHALL BE A HOSE BIB LOCATED WITHIN 65' OF THE SEP, EPC OR THE KRAUS CHILLER.

THE SUPPLY AND RETURN CHILLED WATER PIPES MUST BE LABELED. THE LOCATION OF THE LABELS MUST BE AT ALL CONNECTION AND REFILLING POINTS AND MUST CONTAIN FLOW DIRECTION AND CONTENTS.

CHILLED WATER REQUIREMENTS

FLOW RATE:	31.7 GPM
WATER TEMPERATURE:	66.2°F – 71.6°F
HEAT DISSIPATION TO WATER	204,910 BTU/HR
WATER PRESSURE	MAXIMUM 87 PSI
PRESSURE LOSS	NA
CHILLED WATER ACIDITY RANGE	6 pH TO 8 pH
CHILLED WATER HARDNESS	<250 ppm CALCIUM CARBONATE
CHLORINE GAS CONCENTRATION	<200 ppm
FILTRATION	700 µm

FOR INSTALLATION OF A KKT CHILLER, IT IS THE RESPONSIBILITY OF THE ~~CUSTOMER~~/MECHANICAL CONTRACTOR TO PROVIDE A MIXTURE OF WATER WITH 35%–38% ETHYLENE GLYCOL PRIOR TO CHILLER START UP. DO NOT USE PROPYLENE GLYCOL OR AUTOMOTIVE ANTI–FREEZE.

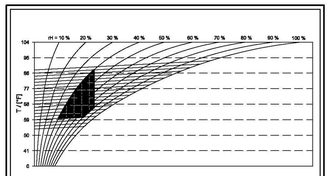
THE AMOUNT OF THE MIXTURE MUST FILL THE CHILLER, MR SYSTEM AND PIPING (SUPPLY AND RETURN), SEE EXAMPLES BELOW.

(1) GALLON OF UNDILUTED GLYCOL, OR (2) GALLONS OF WATER/GLYCOL MIXTURE MUST REMAIN ON SITE FOR USE AFTER START UP.

MIXTURE VOLUME INCLUDING SUPPLY & RETURN+15 GAL. CHILLER & MR

PIPE DIAMETER	TOTAL LENGTH	MIXTURE VOLUME	GLYCOL NEEDED
2"	100'	31.3 GALLONS	11.9 GALLONS
2"	200'	47.6 GALLONS	18.1 GALLONS
2.5"	100'	40.5 GALLONS	15.4 GALLONS
2.5"	200'	66.0 GALLONS	25.1 GALLONS

MIXTURE VOLUME = 3.14 x (PIPE RADIUS)^2 x PIPE LENGTH + 15 GALLONS. GLYCOL AMOUNT = 35–38% OF MIXTURE VOLUME.



REV 0

– TEMPERATURE/HUMIDITY — SCALE: NONE

CEILING HEIGHTS

MAGNET EXAMINATION ROOM: 7'–11" MINIMUM
EQUIPMENT ROOM: 7'–3" MINIMUM WITH RESTRICTION
ALL ANCILLARY AREAS: 6'–11" MINIMUM

MECHANICAL NOTES

1) THE AIR H.V.A.C. SYSTEM MUST OPERATE FOR A MINIMUM OF 48 CONSECUTIVE HOURS PRIOR TO THE DELIVERY OF THE EQUIPMENT.

2) THE FILTERS MUST BE CHANGED IMMEDIATELY PRIOR TO THE DELIVERY OF THE EQUIPMENT.

3) SIEMENS REQUIRES THE USE OF A DEDICATED H.V.A.C. SYSTEM FOR THE EQUIPMENT ROOM TO BE LOCATED, SIZED AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD AND TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

4) SIEMENS RECOMMENDS THAT THE CUSTOMER PROVIDE AND INSTALL AN OXYGEN MONITORING SYSTEM WITH VISUAL AND AUDIBLE ALARMS TO INDICATE WHEN THE OXYGEN CONTAINED IN AMBIENT AIR FALLS BELOW PRE–PROGRAMMED SAFETY LEVELS WITH THE SENSOR TO BE LOCATED IN THE SCAN ROOM IN THE AREA DESIGNATED FOR CRYOGEN FILLING.

5) THE SIEMENS ACTIVE SHIELDED MAGNET RECIRCULATES LIQUID HELIUM, ELIMINATING THE NEED FOR A DEDICATED CRYOGEN STORAGE AREA. THE RECIRCULATING SYSTEM SIGNIFICANTLY REDUCES THE HELIUM "BOIL OFF". THE MAGNET WILL REQUIRE OCCASIONAL FILLING, A DELIVERY ROUTE FOR CRYOGEN DEWARS MUST BE ESTABLISHED. A MINIMUM 36" CLEARANCE IS REQUIRED.

REV 0

FIRE CONTROL NOTES

1) SIEMENS HAS NO SPECIFIC REQUIREMENT FOR FIRE PROTECTION. FIRE PROTECTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH LOCAL CODES AND CUSTOMER'S INSURANCE REQUIREMENTS. ALL FIRE PROTECTION SYSTEMS SHALL BE DEFINED BY THE ARCHITECT OF RECORD WITH DESIGN, SPECIFICATION AND DETAILING OF THE FIRE PROTECTION SYSTEM BY THE MECHANICAL ENGINEER OF RECORD IN ACCORDANCE WITH SIEMENS GUIDELINES AS STATED HEREIN. THE ELECTRONIC EQUIPMENT OF THE MR SYSTEMS WILL BE DAMAGED BY WATER, REDUCTION OR ELIMINATION OF WATER USED FOR FIRE SUPPRESSION WILL REDUCE POTENTIAL WATER DAMAGE. PRE–ACTION INERT GAS, OR HALOCARBONS OR OTHER METHODS CAN REDUCE OR ELIMINATE WATER. REFER TO YOUR FIRE PROTECTION PROFESSIONAL.

2) THE USE OF SMOKE DETECTORS INSIDE OF THE MR EXAMINATION ROOM IS NOT RECOMMENDED. SMOKE DETECTORS, BY DESIGN, CAN GENERATE NOISE THAT MAY INTERFERE WITH THE MRI EXAMINATION AND CAUSE IMAGE ARTIFACTS. IF THE USE OF A SMOKE DETECTOR IN THE EXAMINATION ROOM IS MANDATED BY LOCAL REQUIREMENTS, SPECIAL NOISE TESTS MUST BE PERFORMED BY SIEMENS SERVICE AFTER THE MRI IS OPERATIONAL. MRI EQUIPMENT PERFORMANCE PROBLEMS DUE TO SMOKE DETECTORS ARE THE RESPONSIBILITY OF THE CUSTOMER AND ARE NOT COVERED UNDER WARRANTY OR SERVICE AGREEMENT.

3) ALL MATERIAL USED INSIDE THE MAGNET ROOM SHALL BE NON–MAGNETIC.

4) ALL PENETRATIONS IN THE RF CABIN/SHIELD SHALL BE THROUGH A WAVE GUIDE TO BE EQUIPPED WITH A SIEMENS APPROVED DIELECTRIC COUPLER ON BOTH ENDS OF THE WAVE GUIDE. ALL WAVE GUIDES SHALL BE DESIGNED, DETAILED AND SPECIFIED BY THE RF CABIN/SHIELD CONTRACTOR WITH ALL LOCATIONS TO BE DETERMINED BY THE ARCHITECT AND MECHANICAL ENGINEER OF RECORD TO BE ESTABLISHED IN A PRE–PLANNING MEETING PRIOR TO THE DESIGN, SPECIFICATION, AND FABRICATION OF THE RF CABIN/SHIELD.

5) EACH ELECTRICAL PENETRATION OF THE RF CABIN/SHIELD FOR ELECTRICAL SERVICING OF THE FIRE PROTECTION SYSTEM SHALL BE THROUGH AN RF FILTER TO BE SUPPLIED BY THE RF SHIELD CONTRACTOR WITH FILTER LOCATIONS TO BE DETERMINED BY THE ARCHITECT AND THE ELECTRICAL ENGINEER OF RECORD TO BE ESTABLISHED IN A PRE–PLANNING MEETING PRIOR TO THE DESIGN, SPECIFICATION AND FABRICATION OF THE RF CABIN/SHIELD.

6) IT IS PERMISSIBLE TO RUN "BLACK PIPE" UP TO THE DIELECTRIC COUPLER ON THE OUTSIDE OF THE RF SHIELD.

7) THERE MUST BE NO GROUND CONNECTIONS MADE DURING THE THE INSTALLATION OF EITHER THE PIPING OR ELECTRICAL FOR THE FIRE PROTECTION SYSTEM.

8) THE USE OF HALON IS NOT ACCEPTABLE.

9) THE LOCATION OF FIRE CONTROL SYSTEM COMPONENTS SHALL BE COORDINATED THROUGH THE ARCHITECT OF RECORD WITH ALL LOCATIONS TO BE COORDINATED WITH SIEMENS EQUIPMENT LOCATIONS AS SHOWN ON THE 1/4" SCALE EQUIPMENT LOCATION PLAN.

10) THE FIRE CONTROL CONTRACTOR SHALL VERIFY EQUIPMENT MOUNTING PROCEDURES AND LOCATIONS ON ANY WALLS CONTAINING RF SHIELDING WITH THE SIEMENS PROJECT MANAGER PRIOR TO THE COMMENCEMENT OF WORK.

REV 0

COMPRESSOR LINE INSULATION

COMPRESSOR LINES RUNNING FROM THE COMPRESSOR (OR SEP CABINET) TO THE MAGNET ARE INSULATED BY SIEMENS. ADDITIONAL INSULATION (ARMAFLEX OR EQUIVALENT) FOR NOISE REDUCTION (CHIRPING) MAY BE REQUIRED. ADDITIONAL INSULATION NOT PROVIDED BY SIEMENS.

REV 0

SKYRA REV 9

ATTENTION:

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SYM	DATE	DESCRIPTION
1	11/03/15	CHANGED SD CENTER LOCATION PER CUSTOMER
2	10/22/15	R101R(B) DATED 09/29/15 APPROVED BY CUSTOMER FOR FINALS

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SIEMENS

CINCINNATI VAMC

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MRI SUITE 2024 – MAGNETOM SKYRA W/MOBILE TABLE

PROJECT #: 1400888

SHEET 9 OF 10

DRAWN BY: R. SUTHERS

SCALE: AS NOTED

REF: # 30182993

DATE: 11/03/15

SHEET: M-101

REFERENCE DOCUMENT – NOT FOR CONSTRUCTION

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Revisions	Date

CONSULTANTS:

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Drawing Title: SIEMENS SUPPLEMENT MRI

Approved: Project Director

Project Title: MRI SITE PREP

Location: Cincinnati, Ohio

Date: 10/30/2015 Checked: DLE Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00

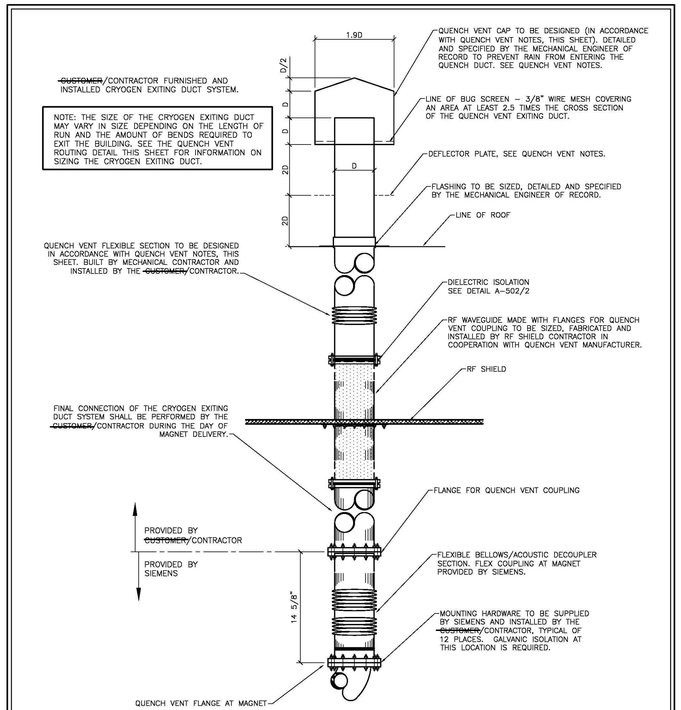
Building Number 01

Drawing Number M-502

Dwg. of

Office of Construction and Facilities Management
Department of Veterans Affairs

FULLY SPRINKLERED



~~CUSTOMER~~/CONTRACTOR FURNISHED AND INSTALLED CRYOGEN EXITING DUCT SYSTEM.

NOTE: THE SIZE OF THE CRYOGEN EXITING DUCT MAY VARY IN SIZE DEPENDING ON THE LENGTH OF RUN AND THE AMOUNT OF BENDS REQUIRED TO EXIT THE BUILDING. SEE THE QUENCH VENT ROUTING DETAIL THIS SHEET FOR INFORMATION ON SIZING THE CRYOGEN EXITING DUCT.

CRYOGEN EXITING DUCT SYSTEM NOTES:

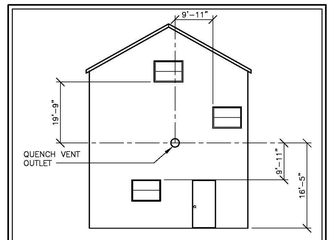
1) THE MECHANICAL ENGINEER OR RECORD SHALL BE RESPONSIBLE FOR THE DESIGN, DETAIL AND SPECIFICATION OF THE CRYOGEN EXITING DUCT SYSTEM WITH ALL WORK TO PERFORMED BY THE ~~CUSTOMER~~/CONTRACTOR UNLESS SPECIFIED OTHERWISE.

2) TAKE PROPER PRECAUTIONS WHEN FIELD WELDING IN THE VICINITY OF LIQUIFIED/FROZEN OXYGEN.

3) UNLESS SPECIFIED OTHERWISE ALL MATERIAL AND WORK SHALL BE PERFORMED BY THE ~~CUSTOMER~~/CONTRACTOR WITH FINAL CONNECTION OF THE CRYOGEN EXITING DUCT SYSTEM TO THE SIEMENS MAGNET TO BE PERFORMED BY THE ~~CUSTOMER~~/CONTRACTOR UNDER SIEMENS' SUPERVISION.

4) THE DIAMETER OF THE CRYOGEN EXITING DUCT MAY VARY WITH ACTUAL ROUTING.

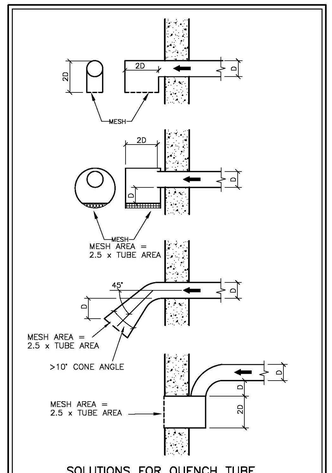
– **CRYOGEN EXITING DUCT SYSTEM DETAIL** — SCALE: NO SCALE



IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET MUST BE TURNED DOWN BY NOT LESS THAN THE LINE OF THE DIAMETER TO PREVENT RAIN INGRESS. THE EXIT MUST BE SITUATED WHERE IT CANNOT BE BLOCKED BY DRIFTING SNOW. TO AVOID RISK OF INJURY FROM COLD BURNS AND ASPHYXIATION, ACCESS TO THE QUENCH VENT OUTLET MUST BE RESTRICTED AS SHOWN. THE OUTLET MUST NOT BE SITUATED WHERE, IN THE EVENT OF A QUENCH, HELIUM GAS COULD BE DRAWN INTO AN AIR INLET OR OPEN WINDOW. WHERE WINDOWS ARE WITHIN THE RESTRICTED AREA, THEY MUST BE PERMANENTLY CLOSED.

OUTLET SAFETY CLEARANCES REV 0

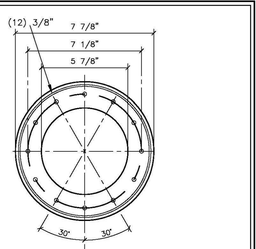
– **QUENCH VENT** — NO SCALE



SOLUTIONS FOR QUENCH TUBE EXITING THROUGH A WALL

SEE QUENCH VENT NOTES REV 0

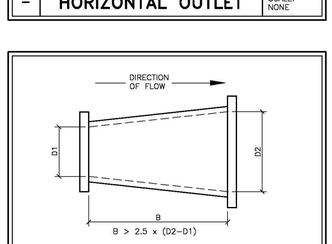
– **HORIZONTAL OUTLET** — SCALE: NONE



QUENCH VENT FLANGE AT MAGNET AND ACCOUSTIC DECOUPLER.

CONNECTION OF THE QUENCH VENT PIPE TO SIEMENS SUPPLIED FLANGE TO BE DESIGNED, DETAILED, AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD. TO BE FABRICATED AND INSTALLED BY THE MECHANICAL CONTRACTOR UNDER SIEMENS SUPERVISION.

2 **QUENCH VENT FLANGE** — NO SCALE

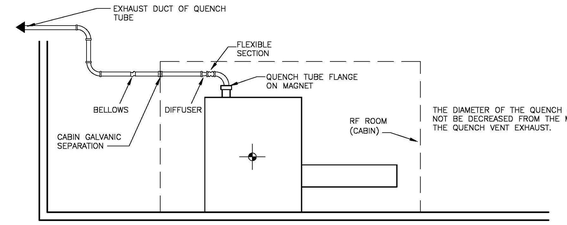


EXPANSION TO A GREATER DIAMETER TUBE CAN BE ACCOMPLISHED BY USE OF A DIFFUSER. THE DIFFUSER MUST MEET QUENCH VENT REQUIREMENTS AND THE GEOMETRIC PARAMETERS SHOWN HERE. THE DIAMETER OF THE PIPE SHOULD NEVER DECREASE IN THE DIRECTION OF FLOW.

REV 0

– **QUENCH VENT DIFFUSER** — NO SCALE

THE QUENCH VENT CONSISTS OF STRAIGHT SECTIONS AND ELBOW OF A DETERMINED DIAMETER AND LENGTH, FROM THE MAGNET QUENCH VALVE TO THE EXHAUST OUTSIDE THE BUILDING. IT SHALL BE DESIGNED BY THE MECHANICAL CONTRACTOR TO WITHSTAND A MAXIMUM PRESSURE OF 6.5 PSI (SEE QUENCH VENT NOTES–THIS SHEET). THE QUENCH VENT DESIGN MUST PASS THE QUENCH VENT CALCULATOR, PROVIDED BY THE SIEMENS PROJECT MANAGER. A SUCCESSFUL DESIGN WILL COMBINE THE LENGTH OF TUBE, DIAMETER OF TUBE, AND NUMBER OF ELBOWS SO THAT THE MAXIMUM PRESSURE IS NOT EXCEEDED.

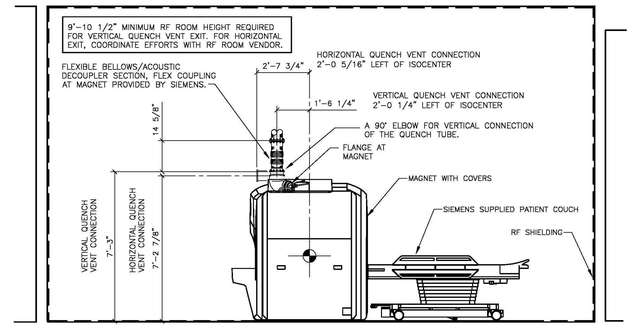


REV 0

– **QUENCH VENT DESIGN** — NO SCALE

THE EQUIPMENT CONFIGURATION SHOWN ON THESE ELEVATIONS REPRESENT "TYPICAL" INSTALLATION CONDITIONS.

THE QUENCH VENT IS TO BE SUPPLIED AND INSTALLED BY THE MECHANICAL CONTRACTOR. IT MAY BE CONNECTED TO THE FLANGE AT THE MAGNET HORIZONTALLY OR VERTICALLY AND SHOULD BE DESIGNED, CONSTRUCTED AND INSTALLED AS PER THE INSTRUCTIONS ON THIS SHEET.



THE LOCATION, PITCH, AND MOUNTING HEIGHT ABOVE FINISHED FLOOR FOR THE MECHANICAL SYSTEMS SHALL BE SPECIFIED, DETAILED AND NOTED BY THE MECHANICAL ENGINEER OF RECORD. ALL MECHANICAL SYSTEM LOCATIONS SHALL BE COORDINATED WITH THE LOCATION OF THE CABLE TRAYS AS SHOWN ON THE 1/4" SCALE ELECTRICAL PLAN.

1 **MAGNET SIDE ELEVATION** — NO SCALE

QUENCH VENT NOTES

1) IN THE EVENT OF A QUENCH, THE THERMAL ENERGY DISSIPATED CAUSES AN EXTREMELY RAPID BOIL OFF OF THE LIQUID HELIUM. THE SYSTEM MUST BE CAPABLE OF VENTING THE LARGE VOLUME OF GAS GENERATED AT THE APPROXIMATE EXPANSION RATIO OF 1:700 FROM LIQUID AT 4.2°K TO ROOM TEMPERATURE GAS. THE EXHAUST SYSTEM IS CRITICAL FOR THE SAFE OPERATION OF THE MAGNET, THE DATA IN THIS DOCUMENT MUST BE FOLLOWED. SINCE HELIUM VENTED IN A QUENCH IS AN ASPHYXIANT & AN EXTREMELY COLD GAS, THE QUENCH TUBE MUST ALWAYS END AT A POINT WHERE ACCESS BY PEOPLE IS NOT POSSIBLE. QUENCH TUBE PLANNING MUST ONLY BE DONE BY QUALIFIED PERSONNEL. IT IS THE OWNER'S RESPONSIBILITY TO ENSURE THAT THE QUENCH TUBE IS MAINTAINED IN AN OPERABLE STATE.

2) IF THE QUENCH VENT IS NOT CONFIGURED CORRECTLY THERE IS A RISK OF DANGER THAT MAY LEAD TO DEATH OR SERIOUS INJURY AND CAN RESULT IN STRUCTURAL DAMAGE. THE EXHAUST MUST NOT BE VENTED IN AN ENCLOSED SPACE. THE OPERATOR OF THE SYSTEM MUST PREPARE AN EMERGENCY PLAN IN THE EVENT OF A QUENCH.

3) THE QUENCH TUBE CONSISTS OF STRAIGHT, HYDRAULICALLY SMOOTH SECTIONS, BENDS UP TO 90° AND A DIFFUSER, IF REQUIRED. THE END OF THE TUBE MUST BE PROTECTED FROM RAIN, SNOW, AND FOREIGN OBJECTS. ROUND SECTIONS ONLY, NO SQUARE SECTIONS.

4) THE SIEMENS MAGNET HAS A QUENCH VALVE ASSEMBLY FOR CONNECTION TO THE TUBE LOCATED AT THE TOP LEFT SIDE OF THE MAGNET (SEE MAGNET ELEVATION). THE MECHANICAL CONTRACTOR WILL SUPPLY AND INSTALL A QUENCH VENT TUBE WITH CAP, TO BE NON–MAGNETIC STAINLESS STEEL, (≥22 GAUGE RECOMMENDED), GRADES AISI304, 309, 316, OR 321 ONLY. THERMAL CONDITIONS MAY CAUSE THE TUBE TO CONTRACT UP TO 3mm/METER SO A STAINLESS STEEL BELLOWS OR FLEXIBLE SECTION MUST BE INSTALLED A MINIMUM OF EVERY 32'–9" NOT TO EXCEED 2% OF THE OVERALL LENGTH. THE QUENCH TUBE MAY ALSO BE MADE OF ALUMINUM, EXTRUDED TUBE ALUMINUM GRADES 6063 AND 6082 ONLY MUST BE USED. ROLLED AND WELDED TUBE FROM SHEET ALUMINUM GRADE 5083 ONLY MUST BE USED. THE WALL SECTIONS OF ALUMINUM TUBE MUST BE A MINIMUM 14 GAUGE. THERMAL CONTRACTION OF 4.5 MM/METER MUST BE CONSIDERED FOR ALUMINUM QUENCH TUBES. THE MOVEMENT OF THE BELLOWS MUST BE RESTRICTED TO PREVENT EXCESSIVE EXPANSION DUE TO PRESSURE. THE WEIGHT OF THE TUBE MUST BE SUPPORTED BY THE BUILDING AND BE FLEXIBLE ENOUGH TO ALLOW MOVEMENT FROM THERMAL CONTRACTION. THE WALL EXIT SHOULD ALSO BE FLEXIBLE.

5) THE MAXIMUM INTERNAL PRESSURE IS CALCULATED AT 1.45 PSI. THE MAXIMUM PRESSURE SHOULD BE ENGINEERED FOR 6.5 PSI.

6) USE THE QUENCH VENT CALCULATOR PROVIDED BY SIEMENS TO DESIGN A QUENCH VENT THAT MEETS DESIGN REQUIREMENTS FOR DIAMETER, LENGTH, NUMBER OF ELBOWS AND PRESSURE DROP. ALL BENDS MUST BE SMOOTH WALLED AND HAVE A CENTERLINE TO INTERNAL PIPE DIAMETER RATIO OF 1.5 TO 5.0. EXPANSIONS TO PIPE DIAMETER CAN BE DONE WITH A DIFFUSER. ONLY ROUND TUBE SECTIONS MAY BE USED, RECTANGULAR SECTIONS ARE NOT ALLOWED.

7) THERE MUST BE A 12–19 INCH FLEXIBLE SECTION OF PIPE FOR CONNECTION TO THE QUENCH VALVE AT THE MAGNET WITH AN INSIDE DIAMETER GREATER THAN 4" (1.5T) OR 6" (3.0T) AND ABLE TO WITHSTAND 6.5 PSI.

8) SECTIONS OF THE PIPE CAN ONLY BE JOINED BY WELDING OR BOLTED FLANGES WITH FIBER GASKETS. ROTARY FLANGES ARE PERMITTED, VEE CLAMPED FLANGES MAY NOT BE USED.

9) THE PROTECTION AT THE END OF THE TUBE SHALL BE 3/8" WIRE MESH COVERING AN AREA AT LEAST 2.5 TIMES THE CROSS SECTION AREA OF THE QUENCH PIPE.

10) WHERE THE QUENCH TUBE EXITS THROUGH A FLAT ROOF, THE THE OUTLET MUST BE ABOVE A LEVEL WHERE WATER COULD ENTER IN THE EVENT THAT THE ROOF DRAINS BECOME BLOCKED. IN THE CASE OF A HORIZONTAL EXIT THROUGH A WALL, THE OUTLET SHALL BE ANGLED DOWNWARD NOT LESS THAN 1 PIPE DIAMETER TO PREVENT RAIN INGRESS. THE EXIT SHALL BE LOCATED ABOVE THE LEVEL OF DRIFTING SNOW.

11) WHERE THE QUENCH TUBE EXITS VERTICALLY, A RAIN COVER MUST ALSO BE FITTED WITH THE DIAMETER TO BE TWO TIMES THE DIAMETER OF THE QUENCH TUBE. THE CLEARANCE BETWEEN THE RAIN GUARD AND THE MESH SHALL 2 TIMES THE DIAMETER OF THE TUBE. A DEFLECTOR PLATE SHALL BE WELDED TO THE TUBE WHERE IT EXITS THE ROOF TO PREVENT HELIUM FROM RE–ENTERING THE BUILDING. THE DEFLECTOR SHALL BE AT LEAST THE DIAMETER OF THE RAIN GUARD AND LOCATED TWO PIPE DIAMETERS ABOVE THE ROOF AND TWO PIPE DIAMETERS BELOW THE RAIN GUARD.

DURING A QUENCH THE HELIUM GAS EXITING THE QUENCH PIPE MAY BE AT TEMPERATURES OF LESS THAN –400°F. DUE TO THIS TEMPERATURE ROOFING MATERIALS OR ITEMS AROUND THE VENT EXIT MAY BE ADVERSELY AFFECTED. CONSIDERATION OF MATERIALS AND ITEMS PLACED NEAR THE VENT EXIT SHOULD BE TAKEN INTO ACCOUNT SO DAMAGE DOES NOT OCCUR.

12) TO AVOID INJURY FROM COLD BURNS AND ASPHYXIATION ACCESS TO THE QUENCH VENT MUST BE RESTRICTED BY 9'–11" ON EACH SIDE AND BELOW, AND 19'–9" ABOVE WITH WARNING SIGNS. THE EXIT MUST NOT BE LOCATED WHERE HELIUM GAS COULD BE DRAWN INTO AN AIR INLET OR OPEN WINDOW. A WARNING MUST BE PLACED NEAR THE QUENCH VENT OUTLET.

13) THE QUENCH TUBE MUST HAVE MINIMUM 1" INSULATION FOR THE FULL LENGTH. WITHIN THE RF ROOM THERE SHOULD BE A 1" LAYER OF MINERAL FIBER INSULATION WITH A VAPOR BARRIER AND 1" CLASS O OR CLASS AP ARMAFLEX. OUTDOOR PIPES MUST BE WEATHERPROOF. THE TUBE MUST HAVE A WARNING POSTED ALONG IT'S ENTIRE LENGTH FOR EXTREMELY COLD HELIUM GAS – AUTHORIZED PERSONNEL ONLY. THE INSULATION MUST NOT TOUCH THE MAGNET COVERS. TO AVOID RF DISTURBANCES THE INSULATION MUST NOT MAKE ELECTRICAL CONTACT WITH THE WAVEGUIDE.

14) GALVANIC SEPARATION MUST BE PROVIDED BETWEEN THE MAGNET, THE QUENCH VENT, THE RF ROOM, AND THE BUILDING, TWO SEPARATIONS ARE REQUIRED USING STAINLESS STEEL BOLTS, INSULATING BUSHES AND LOCKING NUTS. NO OTHER DESIGNS ARE PERMITTED FOR SAFETY.

15) THE DESIGN AND CONSTRUCTION OF THE QUENCH PIPE MUST BE DOCUMENTED WITH DRAWINGS AND CALCULATIONS THAT ARE KEPT WITH INSTALLATION DOCUMENTS. IT MUST COMPLY WITH THE REQUIREMENTS IN THIS DOCUMENT BEFORE BEING CONNECTED TO THE MAGNET.

REV 2

CRYOGEN NOTES

1) "CRYOGENS" IS A TERM USED TO IDENTIFY THE REFRIGERANT USED TO MAKE THE MAGNET "SUPER–CONDUCTING", IN THIS APPLICATION, LIQUID AND GASEOUS HELIUM. SPECIAL CARE MUST BE TAKEN DURING THE TRANSFILLING OF THE MAGNET WITH CRYOGENS AND NORMAL EXHAUST OF CRYOGENS FROM THE SYSTEM. ASIDE FROM THE OBVIOUS DANGER OF FREEZING, HELIUM GAS WILL ALSO DISPLACE THE OXYGEN IN THE ROOM. THE INSTALLATION OF AN APPROVED TOXGARD MONITORING SYSTEM IS RECOMMENDED.

2) THERE SHALL BE A TRANSPORT ROUTE FOR DELIVERY OF CRYOGENS TO THE EXAM ROOM. SPECIAL VESSELS CALLED DEWARS ARE USED TO TRANSPORT HELIUM. A 250 LITER DEWAR WEIGHS 335 POUNDS AND HAS A 32" DIAMETER, A 500 LITER IS 540 POUNDS, AND IS 42" IN DIAMETER.

3) HELIUM GAS CYLINDERS MAY BE USED DURING THE INITIAL FILLING OF HELIUM INTO THE MAGNET. THE FACILITY IN WHICH THESE MAY BE USED NEEDS TO HAVE THE ABILITY TO TEMPORARILY STORE AND SECURE THESE CYLINDERS THAT WILL PREVENT THEM FROM INADVERTENTLY FALLING OVER.

4) OUTSIDE VENTING OF THE HELIUM IS TO BE PROVIDED BY MEANS OF A VENT PIPE OF NON–MAGNETIC MATERIAL CALLED A QUENCH VENT.

REV 0

HELIUM CONTENT

LITERS AT 100%	1,190	
TYPICAL BOIL OFF RATE	0.0 L/HR	FOR TYPICAL CLINICAL USE, DEPENDING ON SEQUENCES AND OPERATING TIME.
TYPICAL REFILL INTERVAL	10 YEARS	

WITHOUT THE COLD HEAD RUNNING THE LIQUID HELIUM WILL BOIL OFF FROM 98% TO 0% IN APPROX. 29 DAYS. THE LOSS DURING SHIPPING IS APPROX. 3.3% PER DAY.

SKYRA REV 9

SYM	DATE	DESCRIPTION
1	11/03/15	CHANGED ISO CENTER LOCATION PER CUSTOMER
2	10/22/15	R101R(B) DATED 09/29/15 APPROVED BY CUSTOMER FOR FINALS

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MRI SUITE 2024 – MAGNETOM SKYRA W/MOBILE TABLE

PROJECT #: 1400888
SHEET OF 10 10
DRAWN BY: R. SUTHERS
SCALE: AS NOTED
REF: # 30182993
DATE: 11/03/15

SHEET: M-501

REFERENCE DOCUMENT – NOT FOR CONSTRUCTION

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Revisions	Date

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Approved: Project Director

Project Title: MRI SITE PREP
Location: Cincinnati, Ohio
Date: 10/30/2015 Checked: DLE Drawn: WJS

Project No. VA Project No. 539-CSI-201 3585.00
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Drawing Number M-503
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Office of Construction and Facilities Management
Department of Veterans Affairs